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A Study on Solar Power Plant

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ABSTRACT: Sun is a good source for electrical energy production, sun produces solar energy which is renewable energy resource, sunlight produces solar energy which is never ending energy and it's free from ecofriendly, sun diverse much energy on earth every hour and whole year to fulfill earth energy demand for a year. For today's scenario everyone needs electricity for different uses every time so to fulfill the energy level solar energy is also used as an energy production source. Solar energy generated as per commercial use or industrial use and residential use. It can directly convert or use sun energy to convert it into electrical energy, due to use of solar energy it is very efficient and non-environment polluting. In this paper discussed about the future of solar energy and their advantages, disadvantages also discussed about their applications and future scope of solar cells and solar energy, this paper also discussed about the working of solar cells, types of solar panels and different methods to increase solar use in every country.

KEYWORDS: Applications, Energy, Environment, Efficient, Solar, Sun, Solar panels, Solar cells, tracking.

I. INTRODUCTION

Solar is a renewable energy resource which is used to convert energy from light to electric energy. It works on the principle of photoelectric effects [1].

What is the photoelectric effect?

The photoelectric effect, it is effective to produce electric current when electrons at the metal plate start moving when energy or electromagnetic radiation such as light or heat pass or hit in the surface of metals [2]. Photoelectric effect has been in use from 1990 and solar cells come after that. On the surface of metals when sunlight drops off different radiation then due to heat metals bonds start breaking and unpaired electrons start moving throughout the surface of metals which cause current production on the surface this effect is known as photoelectric effect and photovoltaic effect is the current produced when charge particles are contained within the surface. Solar panel works on photovoltaic effect because its charge particles do not come out to the surface [3]. The solar panels, solar panels aligned in such a way that it can absorb maximum energy and different countries have their different sunrise and sunset timing so according to their sunrise and sunset timing solar panels give their best output [4].

Different size solar panels responsible for different power ratings. A 25 kW solar PV is proposed for the lighting load application with minimum storage batteries. The power saved considering the 75% loading = 25kW

Average daily available hours = 8hr/day

Electricity saved = $8 \times 25 = 200$ kWh/day

Yearly availability = 250 days/year

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Years saving in electricity = $250 \times 200 = 50000 \text{ kWh} = 50000 \text{ unit}$

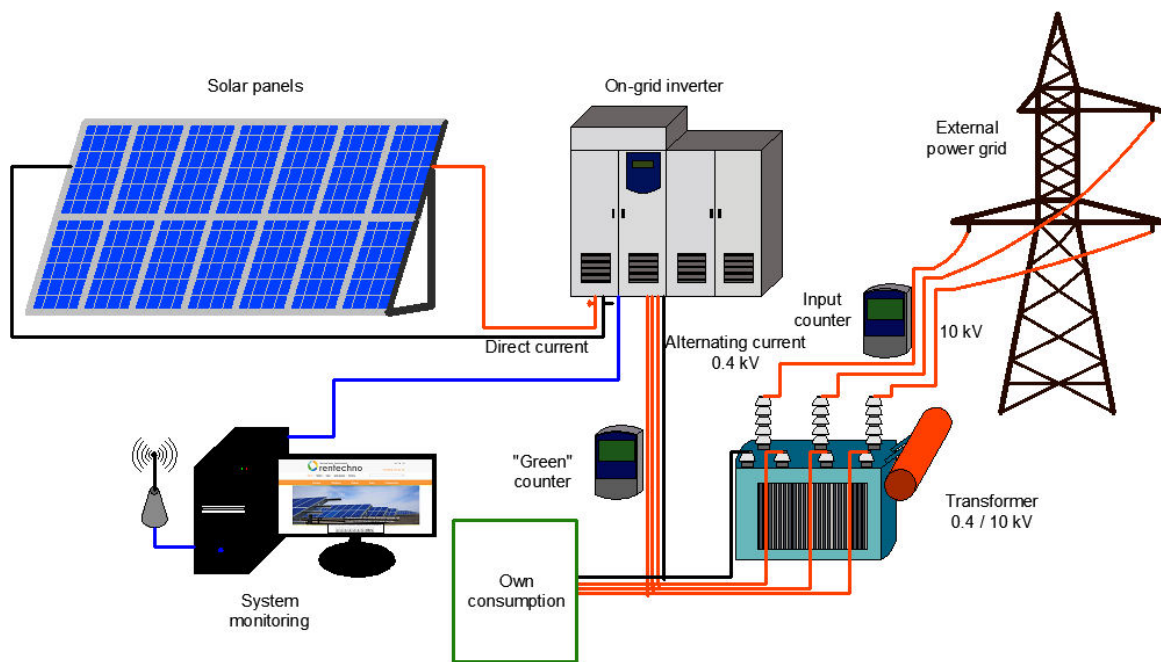


Figure 1: Basic pictorial view of solar plant

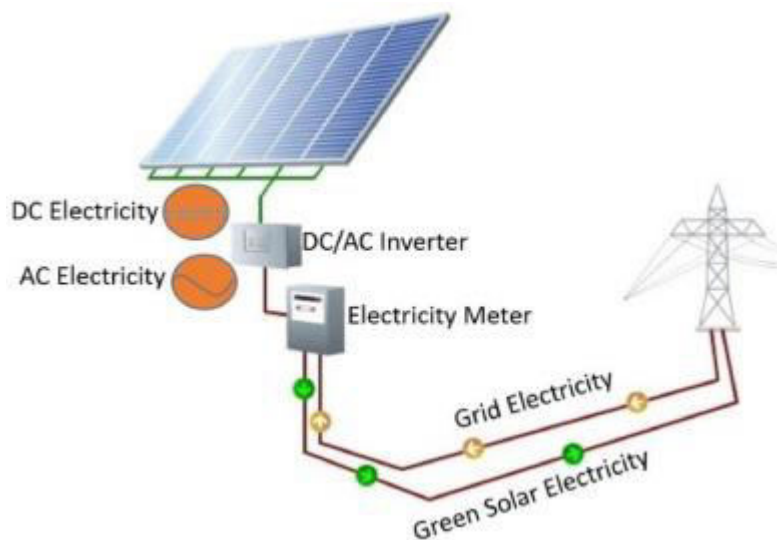


Figure 2: A Typical solar panel

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Figure 2 consists of DC electricity and AC electricity DC/AC inverter and electricity meter a grid connected with tower another grid connected to tower. Solar panels has number of cells which are connected electrically with each other and it absorbs light energy and convert that light energy into electrical energy and that electric energy stored in battery then inverter used to convert DC to AC, amount of energy produced is then calculated by energy meter and two wire from energy meter a grid electricity and green solar electricity passes to tower. Different tower is of different rating and it connected with substation and passes electricity to industrial area, commercial area and for houses[5]. Solar panels have their advantage because of which it is in high use producing energy from solar power plants can save energy and saves up to 20% of energy costs so it is cost beneficial also. Solar power plants can be used at various places such as in urban areas and rural areas also in remote locations. Installing a solar power plant requires large space for more power rating plants but installation of solar power plants is easy because it does not require not required any wires, cords etc.

Rooftop or terrace can also be sufficient for the installation of different ratings of solar power plants means it does not require new or large space it can work for smaller ratings and can be managed in small space. So installation of power plants at any place for domestic and industrial use can be possible and they can generate or produce their own power or electricity. Also sunlight is free of cost, eco-friendly, renewable resource. Every part of the solar power plant is stationary, no moving part and not needed any additional fuel. Only sunlight is sufficient for electric energy production, there is no need for fuel or water to run the solar power plant. It can operate automatically[6]. Basically the operation of a solar power plant consists of a bank or group of solar panels for receiving sun's energy which is converted into DC electric power by photovoltaic (PV) effect produced by the PV cells in the panels. This DC electric power is fed to a battery which stores the energy[7].

II. LITERATURE REVIEW

There have been many research papers published in the field of solar energy and still research in the field of solar is going on in some research paper one research paper titled "a review paper on electricity generation from solar energy" by mohdrizwansirajuddinshaiikh, santoshb.waghmare, suvarnashankarlabade, poojavittal fuke, aniltekale gives information about the solar energy production and how to maximum utilization of solar energy can possible, internal process of solar energy production and formation of energy has been discussed in this paper. Working of solar energy, different types of solar panels, and their modelling, photovoltaic cell and modelling design and operation of photovoltaic cell, study of photovoltaic panel and photovoltaic cell, discussed about the solar concrete collector, parabolic trough reflectors and discussed about fresnel lens, parabolic dish, central receiver merits of solar energy and demerits of solar energy and their applications[8].

In a research paper titled "intelligent sun-tracking system for efficiency maximization of photovoltaic energy production" by João M. G. Figueiredo 1, José M. G. Sá da Costa discussed system description and use of different sensors for tracking of sunlight. LDR sensor stands for light decreasing resistance which works on the principle of photoconductivity used to track the intensity of light means it is light detection by the sensor in such a manner that it reduces the resistance according to the need of light it decreases its resistance value. Study of electro-mechanical structure for the tracking of solar light, used of PLC (programmable logic controller) and SCADA (supervisory control and data acquisition) programming for the intelligent operation of solar panels, solar cells and solar arrays[9].

III. CONCLUSION

In India and many countries they are aware about the non-renewable energy resources like wind, thermal, solar, geothermal and hydroelectric energy. In these renewable energy resources solar energy becomes the most popular and interesting topic in the research field due to its benefit in economics. Also it looks fancy. Electric energy produced from solar is very reliable because it has battery backup it can supply energy 24x7 even in cloudy days and at night also. Solar power plants use an inter grid circuit or system which helps it to supply power in a continuous manner, also when

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it comes to profit or benefit from solar energy there is very much advantage of solar energy instead of other energy sources like fossils fuels and petroleum. According to the demand of solar panels in every country it has a very bright future scope.

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